

CLAIMS

WHAT IS CLAIMED:

1. A method of determining at least one exposure parameter for a multi-step
5 exposure process in a semiconductor line, the method comprising:

obtaining information about an inline parameter indicative of a characteristic of a
predefined location on a substrate; and

updating said at least one exposure parameter for said predefined location on the basis
of said information.

10 2. The method of claim 1, wherein said inline parameter indicates a characteristic
of a process tool used in said semiconductor line.

15 3. The method of claim 1, wherein said information includes measurement data
related to said inline parameter.

4. The method of claim 3, wherein said measurement data is obtained prior to
exposing said substrate.

20 5. The method of claim 3, wherein said measurement data is obtained after
exposing said substrate.

25 6. The method of claim 1, further comprising obtaining measurement data for an
averaged feedback parameter indicating an averaged characteristic of a feature formed on a
plurality of substrates processed in said semiconductor line.

7. The method of claim 6, wherein said at least one exposure parameter is adjusted on the basis of said measurement data of the averaged feedback parameter.

5 8. The method of claim 1, wherein said information relates to a plurality of inline parameters, each indicating a characteristic of said predefined location of a substrate.

9. The method of claim 8, wherein said information includes measurement data for each of said plurality of inline parameters.

10 10. The method of claim 9, wherein said measurement data for each of said inline parameters is gathered prior to exposing said substrate.

15 11. The method of claim 9, wherein said measurement data for each of said inline parameters is gathered after exposing said substrate.

12. The method of claim 9, wherein said measurement data of at least one inline parameter is gathered prior to exposing said substrate and said measurement data of another one of said inline parameters is gathered after exposing said substrate.

20 13. The method of claim 3, wherein updating said at least one exposure parameter includes determining a target offset for said at least one exposure parameter at said specified location on the basis of the difference of said measurement data and a target value of said inline parameter.

14. The method of claim 1, wherein said inline parameter indicates at least one of a layer thickness of an anti-reflective coating, a thickness of a resist layer and a topography of said substrate.

5 15. A method of forming a circuit feature on a plurality of substrates in a semiconductor production line, the method comprising:

preparing said substrates for receiving a resist mask corresponding to said circuit feature;

establishing an exposure map for a step and repeat exposure of said substrates;

10 updating said exposure map for a plurality of specified locations on a specified one of said substrates on the basis of inline measurement data obtained from one or more of said substrates;

exposing said specified substrate with said updated exposure map to form said resist mask; and

15 performing a manufacturing sequence to form said circuit feature by using said resist mask.

16. The method of claim 15, wherein at least a portion of said inline measurement data is obtained from substrates prior to exposure.

20 17. The method of claim 15, wherein at least a portion of said inline measurement data is obtained from substrates after exposure.

25 18. The method of claim 15, wherein at least a portion of said inline measurement data is obtained from substrates prior to exposure and substrates after exposure.

19. The method of claim 15, further comprising obtaining measurement data from substrates after formation of said circuit feature.

5 20. A method of controlling a multi-step exposure of substrates during the formation of a circuit feature, the method comprising:

obtaining pre-exposure measurement data related to a predefined location on a substrate to be exposed;

adjusting at least one exposure parameter for said predefined location on the basis of said pre-exposure measurement data; and

10 exposing a substrate at said predefined location with the adjusted at least one exposure parameter.

21. The method of claim 20, further comprising obtaining measurement data related to said circuit feature after said circuit feature is completed and adjusting said at least one exposure parameter on the basis of the measurement data related to said completed circuit feature.

20 22. The method of claim 20, further comprising obtaining post-exposure measurement data of substrates after exposure and adjusting said at least one exposure parameter on the basis of said post-exposure measurement data.

23. A method of controlling a multi-step exposure of substrates during the formation of a circuit feature, the method comprising:

obtaining post-exposure measurement data related to a predefined location on a substrate to be exposed;

5 adjusting at least one exposure parameter for said predefined location on the basis of said post-exposure measurement data; and

exposing a substrate at said predefined location with the adjusted at least one exposure parameter.

10 24. The method of claim 23, further comprising obtaining measurement data related to said circuit feature after said circuit feature is completed and adjusting said at least one exposure parameter on the basis of said measurement data related to said completed circuit feature.

15 25. The method of claim 23, further comprising obtaining pre-exposure measurement data of substrates prior to exposure and adjusting said at least one exposure parameter on the basis of said pre-exposure measurement data.

26. An advanced exposure tool control system, comprising:

20 a control unit operatively connectable to an exposure tool and configured to adjust at least one exposure parameter of said exposure tool, said control unit being further configured to:

receive information about an inline parameter indicative of a characteristic of a predefined location on a substrate; and

update said at least one exposure parameter for said predefined location on the
basis of said information.